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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/747,654	12/30/2003	Hans Butler	081468-0307455	1582

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EXAMINER

CONNOLLY, PATRICK J

ART UNIT	PAPER NUMBER
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2877

DATE MAILED: 04/21/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/747,654

Applicant(s)

BUTLER, HANS

Examiner

Patrick J. Connolly

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PM

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

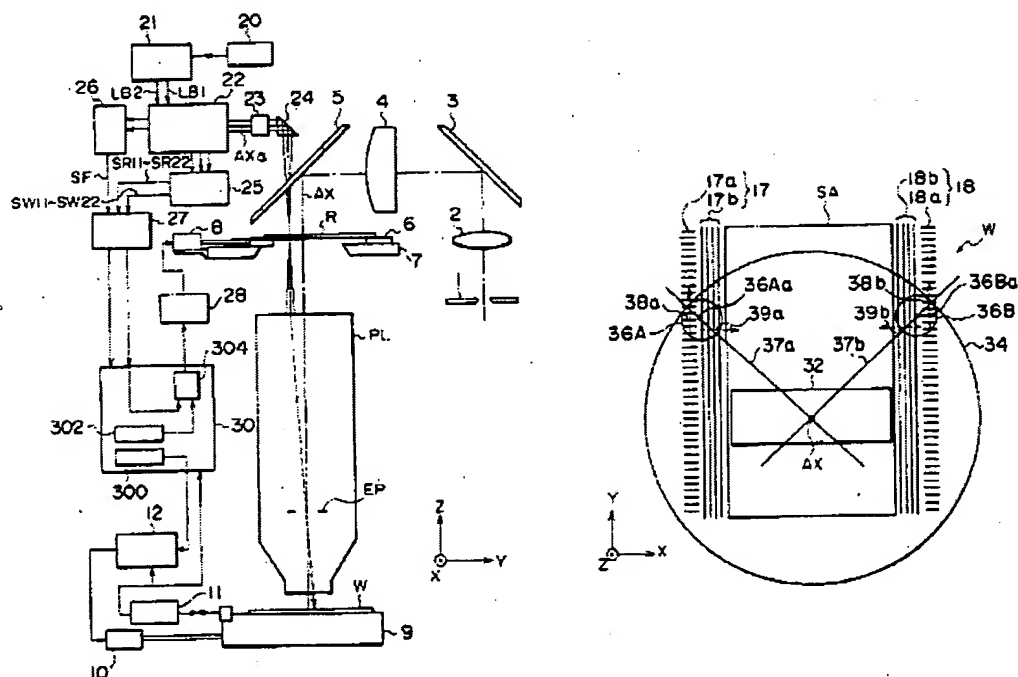
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 14, 16-19 and 21-23 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by US Patent No. 5,751,403 to Mizutani et al (hereafter Mizutani).

As to **claim 1, 18 and 21**, Mizutani discloses a projection exposure apparatus and method including (see Figures 1 and 13 below):



a first object (R) having a first pattern;

a second object (W) having a second pattern corresponding to the first pattern;

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a projection system (PL) configured to project an image of the first pattern onto the second pattern; and

a detector (25, 26) configured to measure an amplitude of at least one order of a diffraction pattern resulting from an interference of the second pattern and the projected image (see column 13).

With further regard to **claims 17 and 18**, Mizutani discloses:

an illumination system configured to provide a beam of radiation (20);

a support structure configured to support a patterning structure (6), the patterning structure configured to impart the beam with a pattern in its cross- section;

a substrate table configured to hold a substrate (9);

a projection system configured to project the patterned beam onto a target portion of the substrate (PL);

a first object having at least a first pattern (R);

a second object having a second pattern corresponding to said first pattern (W); and

a detector (25, 26),

wherein the illumination system is configured to illuminate the first pattern, and wherein the projection system is configured to project a patterned beam including an image of the first pattern onto the second pattern, and wherein the detector is configured to measure an amplitude of at least one order of a diffraction pattern resulting from interference between the second pattern and the projected image (see column 13).

As to **claim 2**, Mizutani discloses longitudinal structures oriented in two different directions (see Figure 13 above).

As to **claim 3**, Mizutani discloses alternating structures (see Figure 13 above).

As to **claim 4**, Mizutani discloses photodetectors (25, 26).

As to **claims 5, 6 and 19**, Mizutani discloses measuring the amplitude in synchronism with illumination and positioning of the wafers (see column 10, second paragraph).

As to **claim 14**, Mizutani discloses a detector located outside of the projected image (see Figures above).

As to **claim 16**, Mizutani discloses measuring at different relative positions (see for example, column 15).

As to **claim 22**, Mizutani discloses a beam of radiation (20).

As to **claim 23**, Mizutani discloses exposing the substrate with a pattern based on positioning (see for example, column 9, lines 40-56).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 7, 15, 20 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani.

As to **claims 7 and 24**, Mizutani is silent regarding the depth of the phase grating in the second pattern.

It is well known in the art that the peak phase modulating will occur in gratings when the grating depth is near $\frac{1}{4}$ the wavelength of the light source being modulated (see for example, the

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gratings of U.S. Patent No. 5,225,039 to Ohguri. These gratings are for use in DFB lasers, but the advantage of peak modulation at that grating depth is still taught).

The Examiner takes Official Notice of the fact that it would be obvious to optimize the modulation implemented by the patterns of Mizutani by using gratings with depths of near or at $\frac{1}{4}$ wavelength of the light source so as to achieve strong amplitude measurements for better positioning measurements.

As to **claims 15 and 20**, although Mizutani teaches overlay measurement based on the corresponding relative displacement of the two patterns, Mizutani is silent with respect to calibration procedure.

The Examiner takes Official Notice of the fact that it is well known in the art to calibrate overlay apparatuses based upon relative displacement measurements of overlay patterns so as to achieve more accurate measurements and exposures in the lithography process.

It would have been obvious to one of ordinary skill in the art at the time of invention to calibrate the apparatus of Mizutani based upon a measurement of the relative displacement of the overlay patterns in order to improve accuracy and efficiency in the lithographic exposure process.

Claims 8-13 and 25-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani as applied to claims above, and further in view of U.S. Patent No. 5,754,341 to Takata et al (hereafter Takata).

As to **claims 8-13 and 25-28**, Mizutani teaches measuring the ± 1 order of diffraction. Mizutani does not teach measuring even orders of diffraction.

Takata teaches phase gratings for use in optical encoders including measuring even and odd orders of diffraction (see Figure 4, column 11) based on the relative sensitivities of the orders with regard to direction of movement.

It would have been obvious to one of ordinary skill in the art at the time of invention to detect multiple orders of diffraction, including both even and odd orders, with the apparatus and method of Mizutani as taught by Takata so as to achieve the sensitivity desired with regard to direction of movement.

"Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the next reply after the Office action in which the well known statement was made."


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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J. Connolly whose telephone number is 571.272.2412. The examiner can normally be reached on 9:00 am - 7:00 pm Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on 571.272.2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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64, 64, 7056



Hoa Q. Pham
Primary Examiner